

U.S. Fish and Wildlife Service Protective Measures Required Under the Maximum Protection of the Refuge during Exploration Alternative (Alternative C)

Under the Maximum Protection of the Refuge during Exploration Alternative (Alternative C), the U.S. Fish and Wildlife Service (Service) would require that specific protective measures and standards be followed during all phases of oil and gas exploration being proposed by Lexam Explorations (U.S.A.) Inc. (Lexam), including the proposed drilling of two exploratory oil and gas wells on the Baca National Wildlife Refuge (Refuge), to ensure that the surface estate of the Refuge and associated resources are not unreasonably degraded or impacted. These measures shall be equally applicable to Lexam's employees, representatives, consultants, contractors and subcontractors. The Service also will require that Lexam resubmit a new Plan of Operations that addresses deficiencies identified in the current Plan of Operations and implements protective measures required by the Service.

Under this alternative, drilling would occur from a vertical well at Baca #5 and a vertical well at Baca #7. However, at the request of the Service, Lexam has agreed to conduct their exploration activities including construction of roads and pads in sequential order, beginning first at their primary target (Baca #5). After Baca #5 is drilled, Lexam will make a decision on whether sufficient information was obtained, or if proceeding with construction and drilling at Baca #7 is necessary. The Service's request for sequential exploration at Baca #5 then at Baca #7 does not affect the scope of the analyses in this Draft EA because the impacts of both wells (Baca #5 and Baca #7) have been assessed throughout Chapter 4.

Specific protective measures would be required by the Service to minimize and mitigate the potential effects of Lexam's Plan of Operations on the surface and subsurface resources of the Refuge. These protective measures were developed by the Service through information obtained during public scoping, from the Final Settlement Agreement dated September 23, 2010 involving the litigation of the proposal by Lexam (Operator), and by new evidence outlining the potential impacts to resources protected by the Refuge. Of these, protection measures #5, 8, 10, 12, 13, 14, and 32 included in the list below were modified or not included as conditions of approval for prior permits to drill on the Refuge.

Under this alternative, Lexam would be required to implement the following protective measures and conditions outlined below. Specific reference to federal and state laws and regulations are not intended to be all inclusive. Therefore, all applicable federal and state laws in addition to those highlighted below would still apply to the proposed exploration activities.

- 1) All vehicles and equipment from outside the Refuge will be decontaminated per Service procedures to prevent the introduction of noxious weeds to the Refuge. Decontamination will include removal of skid plates for inspection and cleaning if necessary. This measure is subject to the following rules:
 - COGCC rule 1004(e) – “All areas being reclaimed shall be kept as free as practicable of all undesirable plant species designated to be noxious weeds. Weed control measures shall be conducted in compliance with the Colorado Noxious Weed Act, C.R.S. §35-5.5-115 and the current rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act. It is recommended that the operator consult with the local weed control agency or other weed control authority when weed infestation occurs. It is the responsibility of the operator to monitor affected and reclaimed lands for noxious weed infestations. If applicable, the Director may require a weed control plan.”
 - Plants and animals or their parts taken elsewhere shall not be introduced, liberated, or placed on any national wildlife refuge except as authorized. (50 C.F.R. 27.52)
- 2) In order to protect cultural resources Lexam will provide on-site cultural resource monitoring during all ground disturbing activities. This measure is subject to the following rules:

- No person shall search for or remove from national wildlife refuges objects of antiquity except as may be authorized by 43 CFR part 3. (50 C.F.R. 27.62)
- No person shall search for buried treasure, treasure trove, valuable semi-precious rocks, stones, or mineral specimens on national wildlife refuges unless authorized by permit or by provision of this subchapter C; Permits are required for archeological studies on national wildlife refuges in accordance with the provisions of this subchapter C. (50 C.F.R. 27.63)

3) Lexam will provide trained natural resource advisors (NRAs), approved by Service, who will continue to serve as liaisons between the Refuge Manager, construction contractor, and drill rig personnel and ensure that all operations are conducted in a manner that minimizes surface impacts. NRAs have specific skills and duties when working on “sensitive lands,” like a NWR, that enable them to identify deficiencies or negligent activities before issues arise that have the potential to cause unreasonable degradation of the surface and subsurface estate of the Refuge.

4) Impacts to sensitive habitat, wildlife, plants, other sensitive natural or historical resources will be avoided to the extent possible while constructing the access road and well pads. This measure is subject to the following rules:

- COGCC rule 1002(e) – “Existing roads shall be used to the greatest extent practicable to avoid erosion and minimize the land area devoted to oil and gas operations. Roadbeds shall be engineered to avoid or minimize impacts to riparian areas or wetlands to the extent practicable. Unavoidable impacts shall be mitigated. Road crossings of streams shall be designed and constructed to allow fish passage, where practicable and appropriate.”

5) Lexam will provide a resource monitoring plan which must be approved by Service. This plan should include a schedule for gathering data before, during, and after construction and/or drilling activities occur. It should include an assessment of baseline water quality of surface waters, the near-surface unconfined aquifer and the deeper confined aquifers in proximity to the proposed well locations (both up gradient and down gradient), as well as baseline information on soils, vegetation, air quality, sound (e.g., hourly sound pressure, ambient sound levels, etc.), and visual impacts. In addition, it should include provisions for re-sampling in the event of anomalous detections.

6) Pre- and post-drilling aerial photographs will be taken of the proposed drilling and road construction area. The photographs will be color and will provide complete coverage of the drilling and road construction area. The pre-survey documentation shall be submitted within 10 days of initiation of the drilling, the post-survey documentation shall be submitted within 110 days of completion along with a digitized version of the pre-survey photographs. These photographs will become the property of the Refuge. This measure is subject to the following rule:

- COGCC rule 303(d)(3) – “A minimum of four (4) color photographs, one (1) of the staked location from each cardinal direction. Each photograph shall be identified by: date taken, well or location name, and direction of view.”

7) The soils at the location site will be tested using approved standards to determine levels of heavy metals, chemical pollutant, and other contaminants, prior to rig-up operations. Duplicate tests will be conducted before completion or at abandonment. If the exit test reveals levels above the background established by pre-drilling test, cleanup will be required. The most practical method of clean up is soil removal. Any quantity of soil removed will be replaced to the original contours. This measure is subject to the following rules:

- COGCC rule 1003(e)(2) – **“Revegetation of non-crop lands.** All segregated soil horizons removed from non-crop lands shall be replaced to their original relative positions and contour as near as practicable to achieve erosion control and long-term stability, and shall be tilled adequately in order to establish a proper seedbed. The disturbed area then shall be reseeded in the first favorable season following rig demobilization. Reseeding with species consistent with the adjacent plant community is encouraged. In the absence of an agreement between the operator and the affected surface owner as to what seed mix should be used, the operator shall consult with a representative of the local soil conservation district to determine the proper seed mix to use in revegetating the disturbed area. In an area where an operator has drilled or plans to drill multiple wells, in the absence of an agreement between the operator and the affected surface owner, the operator may rely upon previous advice given by the local soil conservation district in determining the proper seed mixes to be used in revegetating each type of terrain upon which operations are to be conducted.”

Interim reclamation of all disturbed areas no longer in use shall be considered complete when all ground surface disturbing activities at the site have been completed, and all disturbed areas have been either built on, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion to the extent practicable, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance levels or reference areas, excluding noxious weeds. Re-seeding alone is not sufficient.”

8) Lexam shall provide Service with a detailed wetland delineation, which shall be performed prior to any disturbance in the immediate Project Area vicinity. This determination should follow U.S. Army Corps of Engineers Hydrogeomorphic Method (Smith et al. 1995). Based on information gathered from the wetland delineation, well sites will be located as far from sensitive wet meadow wetlands as practicable. This measure is important to determine if the following rules apply:

- COGCC rule 303(f) – **“Oil and gas locations in wetlands.** In the event that an operator, otherwise required to file a Form 2A, acquires an Army Corps of Engineers permit pursuant to 33 U.S.C.A. §1342 and 1344 of the Water Pollution and Control Act (Section 404 of the federal “Clean Water Act”) for construction of an oil and gas location, the operator shall so indicate on the Oil and Gas Location Assessment, Form 2A.”
- COGCC rule 1002(e)(2) – “Operators shall avoid or minimize impacts to wetlands and riparian habitats to the degree practicable.”

9) Summaries of all the results generated from the water quality sampling, cultural resource work and any other sampling or monitoring, including the results of Lexam’s exploratory drilling, will be provided to the Refuge Manager upon completion and summation. This measure is subject to the following rule:

- COGCC rule 608(b)(5) – “Copies of all test results described above shall be provided to the Commission and the water well owner within three (3) months of collecting the samples. The analytical data and surveyed well locations shall also be submitted to the Director in an electronic data deliverable format.”

10) Lexam will provide a detailed description of all best management practices that will be used during any aspect of the proposed exploration project. This measure is subject to the following rule:

- COGCC rule 1002(f)(2&3) – Stormwater management - best management practices.

11) All construction of roads and pads will occur in a way that best facilitates their subsequent complete removal and reclamation once Lexam activities have ceased at these sites. This includes separating and stockpiling and covering topsoil layers on-site to be replaced during reclamation. All disturbed areas will be reclaimed per the requirements imposed by the COGCC and with Service input. Only endemic plants and seed mixtures are to be used in reclamation. This measure is subject to the following rules:

- COGCC rule 1002(b)(2) – “The operator shall separate and store the topsoil horizon or the top six (6) inches, whichever is deeper, and mark or document stockpile locations to facilitate subsequent reclamation. When separating the soil horizons, the operator shall segregate the horizon based upon noted changes in physical characteristics such as organic content, color, texture, density, or consistency.”
- COGCC rule 1002(c) – “All stockpiled soils shall be protected from degradation due to contamination, compaction and, to the extent practicable, from wind and water erosion during drilling and production operations. Best management practices to prevent weed establishment and to maintain soil microbial activity shall be implemented.”
- COGCC rules 1003 & 1004 – “Final reclamation of all disturbed areas shall be considered complete when all activities disturbing the ground have been completed, and all disturbed areas have been either built upon, compacted, covered, paved, or otherwise stabilized in such a way as to minimize erosion, or a uniform vegetative cover has been established that reflects pre-disturbance or reference area forbs, shrubs, and grasses with total percent plant cover of at least eighty percent (80%) of pre-disturbance or reference area levels, excluding noxious weeds, or equivalent permanent, physical erosion reduction methods have been employed. Re-seeding alone is not sufficient.”

12) To fully protect the aquifers from contamination through communication in the borehole. The intermediate casing shall extend 500 feet beyond the bottom of Layer #4 of the deep confined aquifer¹. The bottom of Layer #4 must be determined by detailed logging of the lithology during drilling. Although, existing information suggests that the bottom of Layer #4 could be 3,500 feet below the surface, Lexam shall consult with an independent professional geologist (reference CRS-34-1-201) approved by the Service to confirm when the appropriate depth has been reached based on data collected from drill logs.

- COGCC rule 317(d) – “**Casing program to protect hydrocarbon horizons and groundwater.** The casing program adopted for each well must be so planned and maintained as to protect any potential oil or gas bearing horizons penetrated during drilling from infiltration of injurious waters from other sources, and to prevent the migration of oil, gas or water from one (1) horizon to another, that may result in the degradation of groundwater. A Sundry Notice, Form 4, including a detailed work plan and a wellbore diagram, shall be submitted and approved by the Director prior to any routine or planned casing repair operations. During well operations, prior verbal approval for unforeseen casing repairs followed by the filing of a Sundry Notice, Form 4, after completion of operations shall be acceptable.”
- COGCC rule 317(e) – “**Casing where subsurface conditions are unknown.** In areas where pressure and formations are unknown, sufficient surface casing shall be

¹ Lexam must case the entire deep confined aquifer (Aquifer Layer #4). The CDWR (2004) described five separate hydrogeological layers that comprise the aquifer in the San Luis Valley. Each layer is defined based on one or more lithologies with similar hydrogeologic characteristics. Layer #4 occurs within a Sante Fe formation that is predominantly sand and gravel and has up to 50% clay layers in most areas of the SLV. Approximate depth of Layer #4 is from 1,200 to 3,500 feet.

run to reach a depth below all known or reasonably estimated utilizable domestic fresh water levels and to prevent blowouts or uncontrolled flows, and shall be of sufficient size to permit the use of an intermediate string or strings of casings. Surface casing shall be set in or through an impervious formation and shall be cemented by pump and plug or displacement or other approved method with sufficient cement to fill the annulus to the top of the hole, all in accordance with reasonable requirements of the Director.”

13) Lexam shall provide a Storm Water Management Plan (SWMP) which must be approved by Service. This plan should be prepared according to *SWMP* guidelines prepared by the Colorado Department of Public Health and Environment (CDPHE). ***CDPHE guidelines for General Permit Application and Stormwater Management Plan Preparation Guidance*** and should include sufficient information and narrative descriptions regarding construction activities along the existing waterways, locations of all proposed potential discharges, identification of potential pollutant sources, maps detailing all ground disturbing activities at sites, and details and figures for proposed BMPs for these construction activities. An outline is available from CDPHE and should be followed.

- COGCC rule 1002(f)(2&3) - “Oil and gas operators shall implement and maintain Best Management Practices (BMPs) at all oil and gas locations to control stormwater runoff in a manner that minimizes erosion, transport of sediment offsite, and site degradation. BMPs shall be maintained until the facility is abandoned and final reclamation is achieved pursuant to Rule 1004. Operators shall employ BMPs, as necessary to comply with this rule, at all oil and gas locations, including, but not limited to, well pads, soil stock piles, access roads, tank batteries, compressor stations, and pipeline rights of way. BMPs shall be selected based on site-specific conditions, such as slope, vegetation cover, and proximity to water bodies, and may include maintaining in-place some or all of the BMPs installed during the construction phase of the facility. Where applicable based on site-specific conditions, operators shall implement BMPs in accordance with good engineering practices.”
- The Water Quality Control Act (§25-8-501(1), C.R.S.) - Establishes a state water quality management program administered by the Water Quality Control Division (WQCD) which prohibits any person from “discharg[ing]...any pollutant into any state water from a point source without first having obtained a permit from the division for such discharge . . .” Stormwater management for construction activities at oil and gas related sites is currently regulated under two separate agencies within the State of Colorado, the WQCD and the COGCC.

14) Lexam shall provide a Spill Prevention and Countermeasures Plan (SPCC), which must be approved by Service. This plan shall include: a listing of secondary containment and/or diversionary structures or equipment for all oil handling containers, equipment, and transfer areas. It should also include a table identifying tanks and containers at the facility with the potential for an oil discharge; the mode of potential failure; the likely flow direction and potential quantity of the discharge; as well as, provide the secondary containment method and containment capacity. In addition, the plan should include the physical layout of the facility and a facility diagram, which must mark the location and contents of each container. The facility diagram must also include all transfer stations and connecting pipes.

15) A closed loop mud and drill cuttings system will be used to minimize impacts to surrounding habitats. In addition, drill cuttings will be isolated in an above-ground tank during drilling. Cuttings and drilling fluids will be removed from the Refuge and disposed of off-site in accordance with state regulations (50 C.F.R. 27.94; 50 C.F.R. 29.32).

16) Drilling operations will be modified, as necessary, to reduce conflicts with regular Refuge management activities.

17) A gate guard will be provided by Lexam, and approved by the Service, to document traffic entering and exiting the Refuge and to eliminate potential illegal entry onto the Refuge.

18) Arrangements for additional Service law enforcement personnel will be made in the event it is deemed necessary to effectively enforce state, federal, refuge, and wildlife laws and regulations during drilling activities.

19) The Operator's construction and drilling activities will be restricted to the period of August 1 through April 30 to avoid conflicts with wildlife and limit ground disturbance activities to periods of low precipitation minimizing impacts to soil. Any field operations conducted during the Refuge's migratory bird closure period (May 1 through July 31) must be coordinated and pre-authorized by the Refuge Manager or his authorized representative. Service will consider allowing Lexam to continue work in early May if allowing access is necessary to complete activities and such activities would not impact the Refuge and resources greater than what is anticipated in the EA. Absolutely no activities will be permitted beyond May 15. Rig up and rig down operations can only be conducted during daylight hours. However, drilling operations can be conducted 24 hours per day. This measure is subject to the following rules:

- COGCC rule 306(a) – **“Consultation with surface owner.** In locating roads, production facilities, and well sites, or other oil and gas operations, and in preparation for reclamation and abandonment, the operator shall consult in good faith with the surface owner...Such good faith consultation shall allow the surface owner or appointed agent the opportunity to provide comments to the operator regarding preferences for the timing of oil and gas operations and preferred locations for wells and associated facilities.”
- CDOW Actions to Minimize Adverse Impacts to Wildlife Resources - "Schedule construction, drilling, and completion activities to avoid particularly sensitive seasonal wildlife habitats.”

20) Refuge Manager or his authorized representative may require drill pads to be fenced if necessary to prevent large ungulates from gaining access to the sites.

- CDOW Actions to Minimize Adverse Impacts to Wildlife Resources - “Fence livestock and/or wildlife out of newly reclaimed areas until reclamation standards have been met and plants are capable of sustaining herbivory.”

21) To protect special status species such as the Rio Grande Sucker and Rio Grande Chub, the Service requires that Lexam:

- Establish a 0.25-mile buffer zone of no activity around potential and identified habitat.
- Limit vehicle crossings to existing or pre-approved crossings.
- Sample waterways for particulate matter, creating a baseline and regular monitoring during period of activity.
- Assess stability and suitability of road water crossings prior to road construction and drilling activities and perform upgrades, if needed. Conduct periodic monitoring of crossings during activities and documentation of any deficiencies that may occur that may be indicative of potential structural failure.
- Provide dust suppression in the vicinity of waterway crossings.

22) The Operator shall provide detailed maps or plats, as required by COGCC the Refuge Manager or his authorized representative of the proposed project layout, showing routes, staging areas, construction areas, and work locations. This measure is subject to the following rules:

- COGCC rule 303 (c) - "Attached to and part of the Permit-to-Drill, Form 2, as filed shall be a current 8½" by 11" scaled drawing of the entire section(s) containing the proposed well location with the following minimum information:
 - (1) Dimensions on adjacent exterior section lines sufficient to completely describe the quarter section containing the proposed well shall be indicated. If dimensions are not field measured, state how the dimensions were determined.
 - (2) The latitude and longitude of the proposed well location shall be provided on the drawing with a minimum of five (5) decimal places of accuracy and precision using the North American Datum (NAD) of 1983 (e.g.; latitude 37.12345 N, longitude 104.45632 W). If global positioning system (GPS) technology is utilized to determine the latitude and longitude, all GPS data shall meet the requirements set forth in Rule 215. a. through h.
 - (3) For directional drilling into an adjacent section, that section shall also be shown on the location plat and dimensions on exterior section lines sufficient to completely describe the quarter section containing the proposed productive interval and bottom hole location shall be indicated. (Additional requirements related to directional drilling are found in Rule 321.)
 - (4) For irregular, partial or truncated sections, dimensions will be furnished to completely describe the entire section containing the proposed well. (5) The field-measured distances from the nearer north/south and nearer east/west section lines shall be measured at ninety (90) degrees from said section lines to the well location and referenced on the plat. For unsurveyed land grants and other areas where an official public land survey system does not exist, the well locations shall be spotted as footages on a protracted section plat using GPS technology and reported as latitude and longitude in accordance with Rule 215.
 - (6) A map legend.
 - (7) A north arrow.
 - (8) A scale expressed as an equivalent (e.g. - 1" = 1000').
 - (9) A bar scale.
 - (10) The ground elevation.
 - (11) The basis of the elevation (how it was calculated or its source).
 - (12) The basis of bearing or interior angles used.
 - (13) Complete description of monuments and/or collateral evidence found; all aliquot corners used shall be described.
 - (14) The legal land description by section, township, range, principal meridian, baseline and county.
 - (15) Operator name.
 - (16) Well name and well number.
 - (17) Date of completion of scaled drawing."
- COGCC rule 303 (d)(3)(D) - "A topographic map showing all surface waters and riparian areas within one thousand (1,000) feet of the proposed oil and gas location, with a horizontal distance and approximate bearing from the oil and gas location."
- COGCC rule 303 (d)(3)(E) - "An 8 1/2" by 11" vicinity or U.S. Geological Survey topographic map showing the access road from the highway or county road providing access to the proposed oil and gas location."

23) All materials brought into the Refuge to build up the location pad will be authorized by the Refuge Manager or his authorized representative. To minimize the spread of invasive species, no top soils will be brought in from off the Refuge. (50 C.F.R. 27.52; 50 C.F.R. 29.32)

24) The Operator shall have an on-site independent oil and gas consultant present during all phases of exploration and they shall be the sole representative of the Operator and subcontractors regarding all communications and decisions of the Refuge Manager or his authorized representative. The consultant's sole responsibility is to ensure daily compliance with

Refuge, ensure that all oil and gas laws and regulations are followed, report all accidents and/or injuries and keep the Project Leader informed daily. The Operator shall keep the Refuge Manager or his authorized representative informed if there is any change of designated independent oil and gas consultant. (50 C.F.R. 25.72)

25) Refuge officials will conduct an on-site meeting before rig-up with representatives of the Operator, drilling contractor, subcontractors, suppliers and service companies. The purpose of the meeting is to go over regulations and conditions that apply to work crew conduct on the Refuge.

26) Prior to rig-up, an Emergency Preparedness Plan covering exploratory drilling, well control, materials hauling, spill response, and fire evacuation, will be provided to the Refuge Manager and discussed in a pre-operation meeting to be held with local governments. The plan shall contain a telephone list naming key contacts for emergency operations and activation. This measure is subject to the following rules:

- COGCC rule 306 - **Consultation.** The operator shall consult in good faith, as provided . . . [with] local governments that have appointed a local governmental designee and have indicated to the Director a desire for consultation shall be given an opportunity to engage in such consultation."
- COGCC rule 317(l) - "**Flaring of gas during drilling and notice to local emergency dispatch.** Any gas escaping from the well during drilling operations shall be, so far as practicable, conducted to a safe distance from the well site and burned. The operator shall notify the local emergency dispatch as provided by the local governmental designee of any such flaring. Such notice shall be given prior to the flaring if the flaring can be reasonably anticipated, and in all other cases as soon as possible but in no event more than two (2) hours after the flaring occurs."
- COGCC rule 317(B)(d)(6) - "An emergency spill response program that includes employee training, safety, and maintenance provisions and current contact information for downstream Public Water System(s) located within fifteen (15) stream miles of the DCPS Operation, as well as the ability to notify any such downstream Public Water System(s) with intake(s) within fifteen (15) stream miles downstream of the DCPS operations."

27) The Operator will upgrade and maintain all access routes, roads and bridges designated for its use across the Refuge in accordance with acceptable specifications and standards. The Operator shall have road maintenance equipment and operator(s) readily available to perform road repairs and maintenance as needed, or as directed by the Refuge Manager or his authorized representative.

28) Dust levels on regularly traveled access routes must be kept to a minimum. The Operator shall have a water truck and operator(s) readily available to perform dust abatement as needed, or as directed by the Refuge Manager or his authorized representative. Only water will be allowed for dust suppression efforts. Dust control measures shall be implemented throughout the traveled areas of the Project Area in addition to the dust abatement requirement in measure #15. This measure is subject to the following rule:

- COGCC rule 1002(e)(1) - In order to reasonably minimize land disturbances and facilitate future reclamation, well sites, production facilities, gathering pipelines, and access roads shall be located, adequately sized, constructed, and maintained so as to reasonably control dust and minimize erosion, alteration of natural features, removal of surface materials, and degradation due to contamination.

29) The drill site and immediate access roads shall be constructed of Refuge approved material for all drilling locations. Drill pads may not exceed 90,000 square feet in area. All existing drainage patterns within roads to be constructed shall be maintained uninterrupted by the use of culverts, bridges or other applicable techniques as specified and authorized by the Refuge Manager or his authorized representative. This measure is subject to the following rule:

- COGCC rule 1002(d) - The drilling location shall be designed and constructed to provide a safe working area while reasonably minimizing the total surface area disturbed. Consistent with applicable spacing orders and well location orders and regulations, in locating drill pads, steep slopes shall be avoided when reasonably possible. The drill pad site shall be located on the most level location obtainable that will accommodate the intended use. If not avoidable, deep vertical cuts and steep long fill slopes shall be constructed to the least percent slope practical. Where feasible, operators shall use directional drilling to reduce cumulative impacts and adverse impacts on wildlife resources.

30) Upon completion of drilling operations, the Refuge Manager or his authorized representative must be advised within 120 days whether the well is to be retained or plugged. If the well site is to be abandoned, the well is to be plugged according to state law, all above ground structures removed and the site and road restored as directed by the Refuge Manager or his authorized representative. Any damage to existing surface vegetation, water channels, or other physical features shall be restored to original site conditions. All costs shall be born by the Operator. This measure is subject to the following rules:

- COGCC rule 1001(a) - The rules and regulations of this series establish the proper reclamation of the land and soil affected by oil and gas operations and ensure the protection of the topsoil of said land during such operations. The surface of the land shall be restored as nearly as practicable to its condition at the commencement of drilling operations.
- Upon the cessation of operations the area shall be restored as nearly as possible to its condition prior to the commencement of operations. (50 C.F.R. 29.32)

31) Pits, ponds and/or open tanks are prohibited. Fully enclosed portable tanks must be used in circulating operations for the temporary storage of all drilling fluids, cuttings, mud, and contaminants. All drilling fluids, cuttings, mud, contaminants, portable tanks, and other equipment must be transported off Refuge to a state approved facility upon cessation of drilling activity. On-site disposal of drilling fluids is prohibited. It is highly recommended that an auger tank be used for transferring drill cuttings and sand to a vehicle for off Refuge transport. This measure is subject to the following rule:

- COGCC rule 907(c)(2)(c) – Drilling Fluids. Treatment and Disposal. Drilling fluid may be disposed as follows:
 - B. Disposal at a commercial solid waste disposal facility

32) Lexam must provide Service with a written description of how potential produced water and condensate resulting from drill stem testing will be handled and disposed of, in the event that the proposed exploratory wells intersect gas reserves. On-site disposal of produced water is prohibited. Produced water may only be disposed of at an off-site state approved facility following:

- COGCC rule 907(c)(2)(c) – **Produced water disposal**. Produced water may be disposed as follows:
 - C. Disposal at permitted commercial facilities

33) All toxic construction and equipment supplies and refuse (oil, grease, gasoline, diesel, paint, and other petrochemical derivatives) shall be centrally stored. Wastes shall be disposed off

Refuge immediately following completion of drilling operations. In the event of an accidental spill or discharge of oil, brine, or any other petrochemical substance, the Operator shall immediately notify the Refuge Manager or his authorized representative. The Operator shall remove contaminated soils for proper disposal off Refuge, and replace such soils with the same type soils or of a type specified and approved by the Refuge Manager or his authorized representative. A site reclamation plan may be required by the Refuge Manager or his authorized representative. (50 C.F.R. 29.32) This measure is subject to the following rules:

- CDPHE rule 6 C. C. R. 1007-2&3. Solid and Hazardous Waste Commission Regulations. Hazardous wastes require storage, treatment, and disposal practices in accordance with 6 C.C.R. 1007-3. All non-hazardous/non-E&P wastes are considered solid waste, which require storage, treatment, and disposal in accordance with 6 C.C.R. 1007-2.

34) Catch pans or other liner systems approved by the Refuge Manager are required for equipment and locations such as mud pumps, bulk mud additive tanks, fuel tanks, mixing shed, generators, accumulator and lines, and under the entire rig floor. The catch pans will cover the entire surface area under the equipment. The rig floor catch pan will be tied to allow for wash down and mud drainage from drill pipe. The catch pans will be kept free and clean from accumulated debris and spill materials. (50 C.F.R. 27.94; 50 C.F.R. 29.32)

35) The Operator will be responsible for providing all water needed for drilling operations. No waste water will be discharged onto Refuge lands, ditches, or water bodies. The Operator will provide a containerized or temporary septic system for domestic sewage disposal during drilling operations, which shall be removed upon completion of drilling. Use of portable toilets at drill site or the installation of a septic system, or similar treatment system or tanks will be required for any trailer or quarters on site. No surface discharge of septic system or portable toilet water is permitted. Septic tanks must be inspected weekly during operations and pumped as necessary. Upon completion of operations, the septic tanks must be pumped out and all material hauled away.

36) All disposable type materials and trash brought onto the Refuge or generated at the drill site shall be removed from the Refuge on a biweekly basis and upon completion of the drilling activities. The drill site and operational area shall be kept free of debris and trash at all times. Trash shall be contained securely at the drill site in such a manner (fully enclosed trash cages) as to prevent trash from being spread by wind or wildlife. No trash may be disposed of or buried on the Refuge. (50 C.F.R. 27.94)

37) Lexam must implement the recommendations contained in the report entitled "Existing Conditions Report for a Portion of the Lexam Road, Saguache County, Colorado," prepared by Russell Surveyors and Associates, Inc., March 30, 2008, with input from the Service.

38) Lexam must implement the recommendations that were the basis for the air quality report analysis set forth in the "Lexam Baca Drilling Project Visibility Impact Evaluation," Air Sciences Inc., April 30, 2008: (a) power generators will be Tier 2 engines; (b) diesel fuel used in generators and all other non-road engines will be ultra-low-sulfur (less than 0.05 percent sulfur); and (c) disturbed areas will be watered to control the fugitive dust.

39) Lexam must use mufflers on all internal combustion engines and certain compressor components that are designed to further attenuate noise emissions during all exploration activities.

- COGCC rule 802(b) - "Oil and gas operations at any well site, production facility, or gas facility shall comply with the following maximum permissible noise levels. Operations involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation is subject to the maximum permissible noise levels for industrial zones. The type of land use of the surrounding area shall be

determined by the Commission in consultation with the local governmental designee taking into consideration any applicable zoning or other local land use designation.”

40) Upon CDOW recommendation, Lexam has agreed, that in the event of a severe winter, to assist the CDOW with managing for the needs of any wintering big game temporarily displaced by Lexam’s activities within the designated areas, especially if the temporary displacement results in the potential for a decline in overall physiological health of the animals or in increased game damage claims by private landowners. This assistance could occur as a Lexam funded baiting program, feeding program or other form of distribution management as determined appropriate by CDOW within the severe winter range area.

41) A minimum of one up-gradient and two down-gradient monitoring wells will be installed around each drill pad. The wells will be completed in the shallow unconfined aquifer. The locations and elevations of the wells will be surveyed and depth to water will be measured. Water samples will be collected for chemical analysis before the wells are spud and at predetermined intervals thereafter, which will be agreed to by the Service and Lexam. If spills or releases of drilling related chemicals at sites occur, then the sampling frequency may be increased to a frequency agreed to by the Service, Baca Grande Water and Sanitation District, and Lexam.

42) General Refuge access conditions:

- Access is to allow Lexam and/or its contractor’s access to portions of the Refuge for the purpose of carrying out drilling of oil and gas exploration wells Baca #5 and Baca #7. (50 C.F.R. 26.22)
- The Refuge Manager is the coordinating official having immediate jurisdiction and administrative responsibility for oil and gas operations on the Baca National Wildlife Refuge (Refuge) lands and property, all entry upon the Refuge must be coordinated with the Refuge Manager or his authorized representative The Refuge Manager must be advised at least 48 hours in advance of initial activity. (50 C.F.R. 26.22)
- The failure of the United States to require strict performance of the terms, conditions, covenants, agreements, or stipulations of this permit for access to conduct exploration activities on National Wildlife Refuge lands, shall not constitute a waiver or relinquishment of the right of the United States to strictly enforce thereafter such terms, conditions, covenants, agreements, or stipulations which shall, at all times, continue in full force and effect.
- Lexam and/or its contractors shall save, hold harmless, defend, and indemnify the United States, its agents and employees for loss, damages, or judgments and expenses on account of bodily injury, death or property damage, or claims for bodily injury, death or property damage of any nature whatsoever, and by whomever made, arising out of the Operator, his employees, subcontractors or agents with respect to the exploration of any and all mineral rights within the lands administered by the Refuge.
- All applicable federal and state regulations apply and will be in force. Operator shall be responsible for the actions of all exploration and support personnel. Violations of applicable laws or regulations will subject the operator and/or his employees to prosecution under state and/or federal laws. Individuals utilizing the Refuge under the Operator’s authorization are subject to inspections of vehicles and their contents by federal and state law enforcement officers.
- Proof of general liability insurance in the amount of \$1,000,000 must be furnished to repair/mitigate any damages. This does not limit the liability for damages to this amount.

- COGCC rule 708 - **General Liability Insurance.** All operators shall maintain general liability insurance coverage for property damage and bodily injury to third parties in the minimum amount of one million dollars (\$1,000,000) per occurrence. Such policies shall include the Commission as a “certificate holder” so that the Commission may receive advance notice of cancellation.

- Operators will act in a manner that is respectful of Refuge habitats, wildlife, and property. Gates are to be locked or unlocked as they are found. (50 C.F.R. 27.21; 50 C.F.R. 27.51)
- All vehicle access will be restricted to developed roads and two-tracks. All terrain vehicle use and deviations to vehicle use must be pre-approved by the Refuge Manager in writing prior to any action taken. (50 C.F.R. 27.31)
- Vehicle speed limits will be set at the discretion of Refuge Manager and limits will be strictly adhered to. (50 C.F.R. 27.31)
- No pets will be allowed on the Refuge. (50 C.F.R. 28.42; 50 C.F.R. 28.43)
- Possession of firearms, alcoholic beverages or drugs is strictly prohibited on the Refuge. (50 C.F.R. 27.41; 50 C.F.R. 27.42; 50 CFR 27.81; 50 C.F.R. 27.82)
- Fires are strictly prohibited in any areas of the Refuge. (50 C.F.R. 27.95)
- Operators are not to be considered agents of the Service and are not to represent the Service in any matters. (50 C.F.R. 27.84)
- Operators will perform all work in accordance with the highest standards of the industry and to the satisfaction of the Service.
- Operators will perform all work in accordance with all applicable laws and regulations and will obtain all necessary permits or licenses when required to do so. (50 C.F.R. 25.13; 50 C.F.R. 29.32)
- All personnel and activities shall be restricted to the immediate drilling area and the direct access road to the drill site. (50 C.F.R. 26.22)
- Feeding wildlife species is prohibited. Molesting or destroying the home or dens of wildlife is prohibited. If dens are found during the normal course of operations, distinctive flagging will be used to alert all personnel of the den location. Adverse impacts on fish, wildlife and the environment shall be kept to an absolute minimum. All road kills will be reported to the Refuge Manager or his authorized representative. (50 C.F.R. 27.51)
- Littering is prohibited. All cans, bottles, lunch papers, and operations trash must be removed. Cigarette butts are considered litter. All vehicles will be equipped with a container to carry out trash. (50 C.F.R. 27.94)
- All necessary permits, contacts and clearances must be completed or obtained by Lexam prior to the start of the activity. (50 C.F.R. 25.13)
- No overnight quarters will be permitted on the Refuge unless authorized by Refuge Manager. (50 C.F.R. 27.92)
- Re-route the access road to Baca #5 to avoid sensitive plant species and wet meadow habitat (**Figure 2-1**).

Under this alternative, if Lexam discontinues or fails to perform any of the preceding protective measures, and the Refuge Manager believes such failure will lead to unreasonable damages to Refuge resources, the Service may assess penalties pursuant to 50 CFR Part 28 or any of the aforementioned CFRs listed above. The Service may require Lexam to cease exploration activities until the risk of damage to Refuge resources has been removed or mitigated in the sole discretion of the Service.